
APPENDIX F

Operations and Maintenance Plan- ning

A plan for implementation and operations with maintenance requirements should be developed. It should spell out the agreements identified for which agencies will be responsible for various elements on ITS implementation. An operations plan should, as a minimum, address the following issues:

- Operations and maintenance strategy
- Project definition at the level where projects can be included in the Transportation Improvement Program (TIP)
- Planning-level cost estimates
- Project phasing
- Procurement approaches
- Funding levels
- Legal issues
- Ongoing consensus-building

The operations and maintenance requirements of the planned systems must be in balance with the availability of proper personnel, equipment, and budget resources to operate and maintain the systems. Providing qualified personnel and staff with available equipment to operate the system is a must. New equipment and new technologies will require specific operations and maintenance activities that may be unique to each technology and may be foreign to existing staff capabilities.

Most strategic assessment efforts do not go far enough in thinking through approaches to operating ITS. Examining the strategy for operation of a system in greater detail may reveal either gaps in the plan or overlapping unnecessary, or unproductive functions. For example, an effective traveler information system needs to examine where travelers should be receiving information, how frequently, and of what type. These parameters will have implications on sign locations, and the use of alternative information outlets.

At this stage, identification of the maintenance and operations requirements should be based on the assessment of the existing capabilities in terms of personnel, skills, and equipment; determining the necessary skills and work load impacts of the system (by agency and overall); comparing the existing conditions with what is required for the system; analyzing the deficiencies; and establishing the feasibility of providing any additional capabilities required for the system. This capability may range from adding capable staff to training existing staff to private contracting for specific services or even the primary operation and maintenance activity. This issue is critical to assure the system does not become obsolete due to lack of proper operation or maintenance activities.

While much of this discussion has been oriented toward maintaining the system, a similar analysis should be made of the operations staff in the area. Absence of proper staff to operate the system may result in the system losing its effectiveness and support by the region. As a result, at this stage, both levels of resources should be assessed. A key requirement of all staff levels will be "vision" to

assure that the system is kept current and flexible enough to meet the changing needs of the region. The level of analysis should be such that the need for additional capabilities and resources and a plan to obtain the proper resources are identified. This may require detailed documentation for management approvals.

OPERATIONS

Implementing a regional ITS program constitutes a major action on the part of the transportation agencies, leading to the active management of the regional transportation network. As part of that commitment, it is essential that qualified staff be dedicated to the various transportation operations center functions and related management activities. For a roadway-based traffic management system, these activities may include:

- Monitoring the system to determine the current performance of the roadway network, and identifying incidents or unusual congestion
- Verifying incidents and determining the cause of congestion through the use of closed-circuit television
- Reporting of verified incidents and unusual congestion, along, with their causes and other pertinent information, to the State Police, maintenance, and other impacted agencies
- Operating variable message signs including developing and updating the message libraries
- Testing new control strategies
- Keeping records, and day-to-day care of the control center equipment
- Planning and coordination for the system response to construction activities (e.g., analyze traffic data to determine permissible hours of construction operations, develop special sign messages, review construction plans to determine impact on system elements such as detectors)
- Preparing and updating incident response and management plans
- Responding to inquiries from other agencies and the public
- Administering contracts affecting system operations (e.g., construction, maintenance, freeway service patrols)
- Planning and design for the expansion of the system, including implementation assistance
- Interfacing with media and other private entities for dissemination of traveler information

The local operations center should be viewed as the nucleus of the agency's commitment to ITS operations, and staffing levels should complement that overall commitment. The operations staffing requirements are dependent on the complexity and functionality of the ITS-based system, as well as

the hours of operation. On a local agency basis, personnel levels should not be expected to increase significantly over current levels. Existing personnel will, however, be responsible for increased areas of activity, e.g., monitoring and evaluating additional signal timing plans (by time-of-day). Additional maintenance personnel may be required for maintenance/operation of a regional surveillance system (although this is dependent on the quality of the implemented detection systems).

MAINTENANCE

Provisions will have to be made for maintaining the ITS-base system and the associated technologies and electronic components. The agencies may need to hire one or more qualified electronic technician (along with the associated test equipment, vehicles, spare parts, etc.); utilize contract maintenance; or some combination.

Contract maintenance is utilized to some extent in nearly all transportation management systems. Maintenance of the computer hardware and peripherals is a prime example, by which the computer vendor provides both preventative and remedial maintenance, including parts and labor for a fixed monthly fee. Leased/privatized communication networks also involve a form of contract maintenance.

There is precedent for contract maintenance covering all system elements. The Chicago Freeway Surveillance and Control System relies heavily on contract maintenance, and the INFORM system on Long Island, New York utilizes contract maintenance exclusively. Maintenance contracts can be written such that the contractor is paid for each specific work item (e.g., repair/replace DMS module, repair/replace camera assembly, perform preventative maintenance per unit) at an established unit price; or the contractor can be paid on a per month basis which covers all maintenance activities required to keep the system operational, regardless of how many activities are actually performed each month. Whatever the contract language, agency staff must be dedicated to manage and oversee these contracts. Entering into a software maintenance agreement with the system supplier can be a worthwhile and cost-effective endeavor. Under such an agreement, the supplier can correct any latent programming "bugs" (e.g., flaws that do not reveal themselves for a year or longer), make system enhancements based on the experience of the operators, and provide system upgrades. This software maintenance can often be accomplished over a phone link and dial-up modem.

[Return to Table of Contents](#)